Sound Velocity Measurements and P-V-T Eos on Ringwoodite to 8 GPa 873 K *	X17B1

B. Li (SUNY, Stony Brook)

Compressional (Vp) and shear (Vs) wave velocity measurements and Equation of state (P-V-T) studies on a polycrystalline specimen of Ringwoodite $(MgFe)_2SiO_4$ have been conducted using simultaneous ultrasonic interfrometry and *in-situ* X-ray diffraction techniques in a DIA-type, cubic anvil high pressure apparatus (SAM85) installed at beamline X17B at NSLS in Brookhaven National Laboratory. The specimen was hot-pressed at 20 GPa and 1200 ^oC in a 1000-ton Uni-axial Split Cylinder Apparatus (USCA-1000) using San Carlos olivine powder as starting material. Synchrotron X-ray diffraction spectrum indicated that the product was a single phase of ringwoodite. High P and T ultrasonic measurements in the SAM-85 apparatus are implemented by mounting an acoustic transducer at the back of the WC anvil and enclosing glass as an extended buffer rod inside the cubic Boron epoxy pressure medium. Both P and S wave travel times are measured at the same time by using a 10-degree Y-cut Lithium Niobate transducer. The sample is surrounded by NaCl and BN to minimize non-hydrostatic stress. X-ray diffraction from both the sample and NaCl were recorded at elevated pressures and temperatures from which the unit cell volumes of the sample and sample pressures were obtained. Completed P-V-T and Vp and Vs data for the specimen have been collected up to 8 GPa and 873 K with heating/cooling cycles at 2.5, 4.0, 5.3, 6.5, and 8.2 GPa. Analyzing P-V-T and acoustic data produce independent determination of elastic moduli K and G and their pressure and temperature derivatives for this mantle phase, which are very important parameters needed for modeling mantle compositions and interpreting the 520-km discontinuity in the Earth's transition zone.

* This work was supported by the NSF under a grant EAR 89-20239 to the Center for High Pressure Research, and by the DOE under Contract Number DE-AC02-98CH10886 to the NSLS.